

## NEW DESCRIPTIONS

A NEW SPECIES OF HERMIT CRAB, *DIOGENES KARWARENSIS*  
(DECAPODA: ANOMURA) FROM THE WEST COAST OF INDIA<sup>1</sup>V.N. NAYAK<sup>2</sup> AND B. NEELAKANTAN<sup>3</sup>

(With two text-figures)

A new species of hermit crab of the genus *Diogenes* from Karwar in the west coast of India is described. The closely related *Diogenes avarus* Heller available in the same habitat is compared.

## INTRODUCTION

The systematics of shallow water hermit crabs have not been studied in detail from Indian waters, except by Henderson, 1893 and Alcock, 1905. Hermit crab species of the genus *Diogenes* are among the most common and abundant components of the intertidal and estuarine regions of Karwar area along the west coast of India. While working on the systematics of the intertidal Paguridae of Karwar area, several specimens of an undescribed taxon resembling *Diogenes avarus* Heller were collected.

## MATERIAL AND METHODS

Specimens used for the description were collected from Baithkol area about 1 km south of Karwar 14° 18' N and 74° 97' E) and Kali estuary, about 3 km north of Karwar. The holotype has been deposited in the Zoological Survey of India Museum (Reg. No. C 3519/2) along with *Diogenes avarus* Heller (Reg. No. C 3520/2), Calcutta and paratype in the Karnatak University Department of Marine Biology Museum (CA/16/82) and Government Arts and Science College Department of Zoology Museum (ACAhc/16), Karwar. The terminologies used for adult description follow Jackson (1913) and McLaughlin (1974).

## RESULTS

**Shell preference:** This species occupies in the collection localities, the gastropod shells listed below in the order of preference.

1. *Cerithidea cingulata* (Gmelin); 2. *Nassarius stolata* (Gmelin); 3. *Umbonium vestiarium* (Linnaeus); 4. *Natica tigrina* (Roeding); 5. *Thais carinifera* (Lamarck).

**Diagnosis:** Ocular peduncle short and stout, approximately one-half the length of shield. Antennular peduncle as long as antennal peduncle, exceeding ocular peduncle in length. Rostral scale simple and spine-like, never exceeding ocular acicles. Ocular acicles spinulose distally. Antennal acicle short, reaching up to distal margin of fourth segment, never exceeding. Left cheliped spinulose; propodus with a short ridge proximally; carpus with 4 moderately long, conical spines on the distal margin.

**Description:** (Figs. 1 & 2): Holotype herein selected, male, shield length, 3.0 mm. Shield width equalling length, occasionally slightly longer than broad; anterolateral margin sloping or slightly terraced; anterior margin between rostrum and lateral margin slightly concave; posterior margin truncate or roundly truncate; dorsal surface smooth; dorsolateral margins with 3-4 short, transverse rows of spinules and tufts of short bristles; anterolateral angle very slightly produced. Rostrum short, not exceeding lateral projections, broadly rounded. Rostral scale moderately short, acutely pointed, reaching upto the distal margin of ocular acicle or slightly falling short, never exceeding ocular

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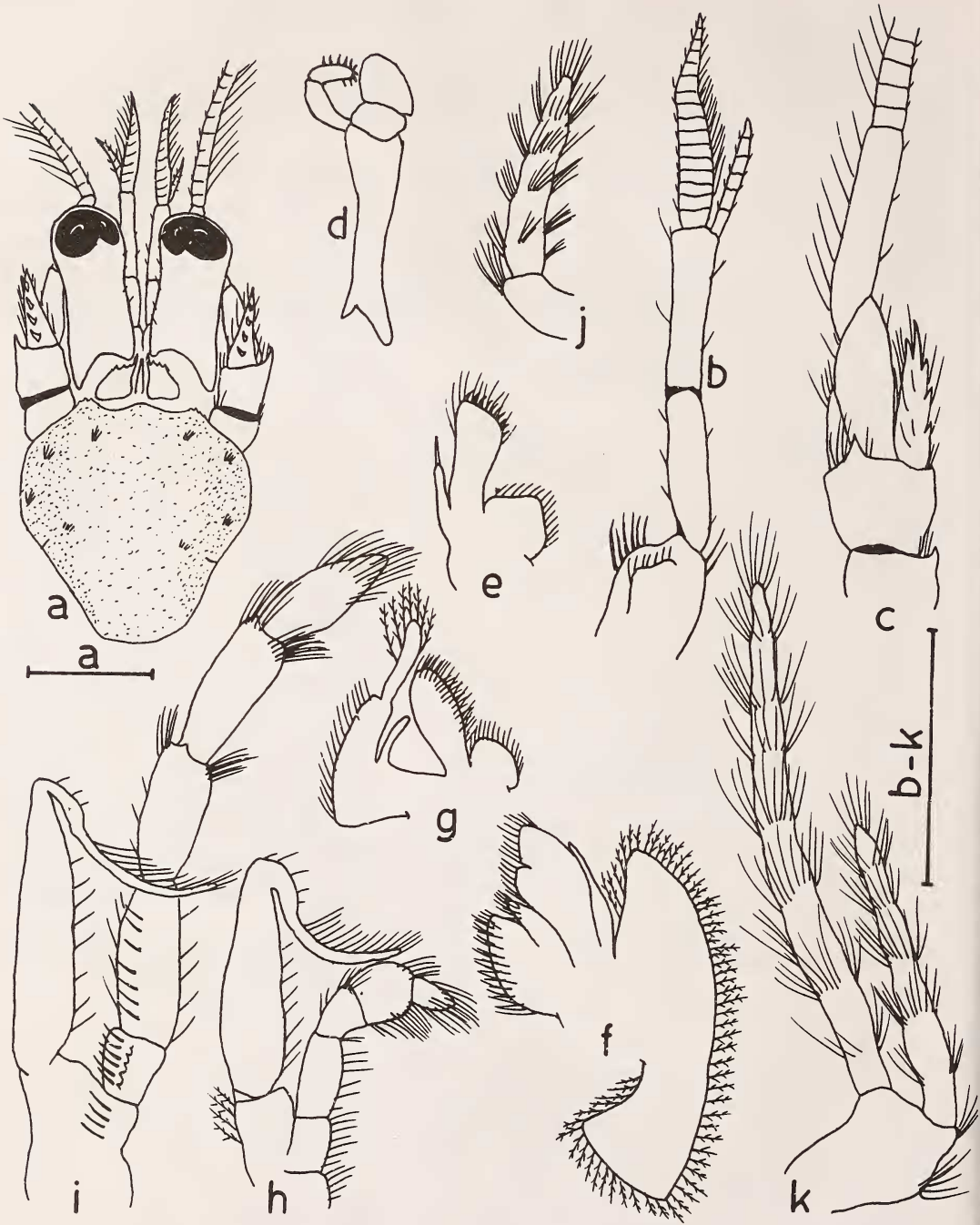


Fig. 1. *Diogenes karwarensis* sp. nov., adult

a. Cephalic shield; b. Antennule; c. Antenna; d. Mandible; e. First maxilla; f. Second maxilla; g. First maxilliped; h. Second maxilliped; i. Third maxilliped; j. Pleopod (male) k. Pleopod (female). Scale: 1 mm.

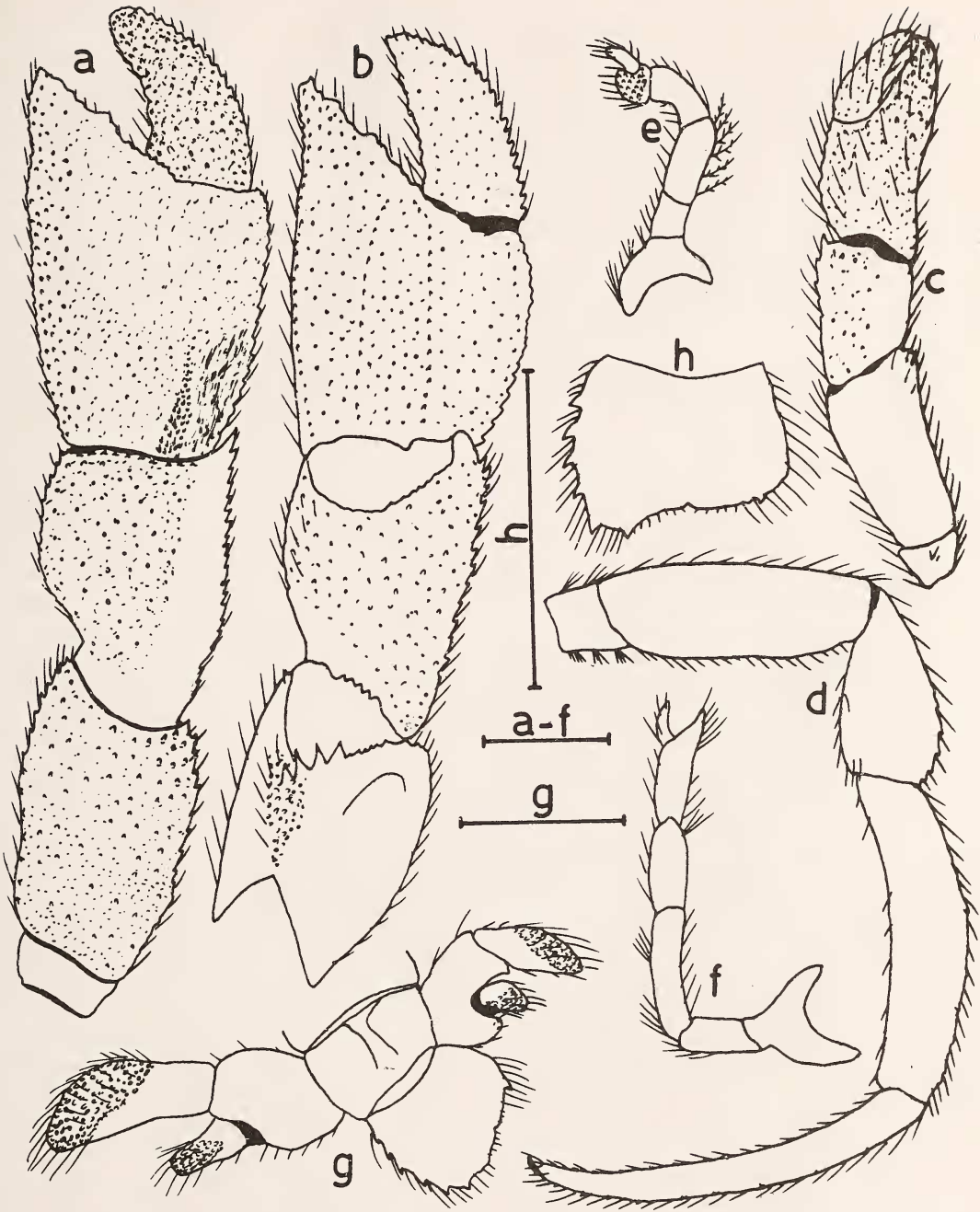


Fig. 2. *Diogenes karwarensis* sp. nov. adult

a. Left cheliped, dorsal view; b. Left cheliped, ventral view; c. Right cheliped; d. Second pereiopod; e. Fourth pereiopod; f. Fifth pereiopod; g. Telson and uropod; h. Telson. Scale: 1 mm.



acicles. Lateral projections broadly triangular, with or without a terminal spinule.

Ocular peduncle short and stout, one-half to two-thirds the length of shield; very slightly inflated basally; somewhat dilated in corneal region; ventral face with a row of tufts of moderately short, plumose setae; corneal portion moderately long, approximately one-fifth the length of peduncle. Ocular acicle triangular, distal margin serrated, spines increasing towards rostral scale, the one nearest being the longest, conical, acute spine, exceeding the distal extension of rostral scale; separated basally by approximately one-half the basal width of one acicle.

Antennular peduncle moderately long, exceeding the length of ocular peduncle by two-thirds to one-half the length of ultimate segment. Ultimate and penultimate segments with very few minute setae; basal segment with a spinule at ventral distal margin; lateral surface and dorsolateral margins with tufts of short setae, dorsolateral distal angle with a row of 3-4 spinules. Dorsal flagellum with about 12 segments and ventral with 5-6 segments.

Antennal peduncle moderately long, as long as antennular peduncle; exceeding ocular peduncle by three-fourths to entire length of ultimate segment, with supernumerary segmentation. Fifth segment with a row of long, plumose setae laterally and few scattered short setae all over. Fourth segment with a short spine dorsally and very few short setae. Third segment with ventromesial distal angle produced, terminating in a subacute spine and tufts of short setae. Second segment with an acute spine on dorsolateral distal angle and tufts of setae. First segment with a short, acute spine on dorsal face distally. Antennal acicle simple, reaching upto the base of ultimate segment or slightly shorter, somewhat triangular, terminating in a strong, simple or bifid spine; dorsal face with a row of 3-4 strong, acute spines; lateral and mesial margins with rows of moderately long setae. Antennal flagellum long, reaching upto the base of dactyl of large cheliped; articles with long, plumose and short setae; flagellum of about 17 segments.

Mandibles without distinctive characters; palp 2-segmented, distal segment with short,

plumose bristles. First maxilla with proximal endite subquadrate or ovately triangular; endopod with a bristle terminally. Second maxilla with endopod inflated basally, exceeding scaphognathite in distal extension. First maxilliped with endopod approximately one-third the length of exopod, reaching upto the distal end of proximal segment; basal segment of exopod somewhat triangular and slender. Second maxilliped with basis-ischium fusion incomplete. Third maxilliped with basis-ischium fusion complete; crista dentata poorly developed with 3-5 short spines and a row of stiff bristles; carpus with a spinule on dorsal distal margin.

Left cheliped considerably larger than the right, approximately one and one-half the length of carapace; overreaching pereopods. Dactyl moderately short, three-fourths the length of palm; fixed finger deflated; overreaching and overlapped by fixed finger, terminating in a calcareous claw; cutting edges with row of strong, calcareous teeth; dorsal surface with a median row of spinules in the distal half and granules scattered all over; dorsolateral and dorsomesial faces with rows of spinules or minute spines; mesial margin with a row of moderately long, subacute spines and tufts of moderately long setae; lateral face with a row of subacute spines; ventromesial face with a row of subacute spines and tufts of moderately long setae; ventral surface with a row of short spines reducing in size distally, very few scattered granules spread in the proximal region. Palm moderately long, as long as or one and one-fifth the length of carpus; dorsal surface convex with a median ridge proximally with irregular rows of acute spines in the proximal half, granules spread all over, more in the median line, forming spinules; lateral face with rows of small spines; mesial face with rows of short, subacute spines and short setae; ventral surface with 2 rows of short spines, subacute spines and granules scattered all over; ventral distal margin with a prominent tubercle near the movable finger. Carpus moderately short, as long as merus; dorsal surface with uniformly scattered short, subacute and acute spines; dorsal distal margin with a row of short spines; mesial margin with a row of prominent, acute spines, increasing in size distalwards;

lateral face with rows of short subacute spines or low tubercles; lateral distal angle with a prominent tubercle; ventral surface with uniformly scattered, irregular rows of subacute spines or low tubercles; ventral distal margin concave with a row of minute spines. Merus moderately long, subtriangular; dorsal surface with irregularly scattered spinules and granules; dorsolateral margin with a row of short spines distally and tufts of setae; dorsomesial margin with a row of short spines increasing in size distally and tufts of setae; mesial distal margin with a row of short spines and tufts of setae; mesial face with very few granules distally; ventral distal margin with 4 long, conical acute spines; ventral surface with short spines or spinules uniformly scattered and tufts of setae; ventrolateral face with irregular rows of small spines or spinules. Ischium moderately short, ventral distal angle produced; lateral face with a low tubercle and 2 - 3 spinules. Coxa short, mesial margin with a low tubercle.

Right cheliped moderately short and slender, reaching up to the base of palm of left cheliped. Dactyl and palm with tufts of setae on all faces. Dactyl moderately long, one and one-third the length of palm; cutting edges with a row of short tubercles; leaving a gap when closed, ending in a calcareous claw; dorsal surface with irregular rows of subacute spines or low tubercles; lateral face with irregular rows of spinules or low tubercles; mesial face with rows of short spines or spinules; ventral surface unarmed. Palm moderately short, as long as carpus; dorsal surface with rows of short spines; lateral face granulose; mesial face with granules; ventral surface with spinules distally and few granules proximally. Carpus three-fourths the length of merus; dorsal surface with irregular rows of spinules and few tufts of short setae; dorsomesial margin with a row of acute spines increasing in size distally and tufts of setae; mesial face with very few granules; ventral distal margin with a row of spinules; ventral surface with tufts of short setae; lateral face granulose. Merus moderately long, subtriangular; dorsal margin with minute granules and tufts of setae. Mesial face even and unarmed; lateral face even, unarmed except for very few granules; ventral surface with few

granules and tufts of setae. Ischium short, ventral distal angle produced; unarmed except for tufts of setae. Coxa with very few granules ventrally.

Second pereiopod falling short of left cheliped, right slightly longer than the left. Dactylus moderately long, one and one-fifth the length of propodus; in lateral view turned ventrally; in dorsal view straight; terminating in a short, corneous claw; dorsal surface with moderately short setae and a row of spinules only in the distal half; mesial and lateral faces unarmed; ventral surface with a row of short setae and rarely a row of spinules. Propodus moderately long, one and one-half the length of carpus; dorsal surface with a row of spinules and a row of short setae; lateral and mesial faces unarmed; ventral surface concave, with a row of short setae. Carpus moderately short, two-thirds the length of merus; dorsal surface with a row of spinules increasing to spines distally and a row of moderately short setae; lateral and mesial faces unarmed; ventral surface smooth. Merus laterally compressed; dorsal margin with very few spinules and tufts of moderately short setae; lateral and mesial faces even and unarmed; ventral margin with a row of tufts of moderately short setae. Ischium moderately short, one-third the length of merus; unarmed except for tufts of short setae dorsally and ventrally. Coxa with few granules laterally and mesially, 1 or 2 tufts of setae present ventrally and dorsally.

Third pereiopod slightly longer than the second, reaching upto the tip of left cheliped. Dactylus moderately long, one and one-fourth the length of propodus; in lateral view turned ventrally; in dorsal view straight; ending in a short, corneous claw; dorsal and ventral margins with tufts of short setae; lateral and mesial faces with very few setae. Propodus moderately long, one and one-half the length of carpus; dorsal surface with a row of spinules and tufts of short setae; lateral and mesial faces unarmed; ventral surface concave with very few short setae. Carpus moderately short, as long as four-fifths the merus; dorsal distal angle with a short spine; dorsal surface with a row of spinules and tufts of short setae; mesial and lateral faces unarmed; ventral surface with



very few minute setae. Merus laterally compressed; dorsal and ventral margins with tufts of short setae; lateral and mesial faces even and unarmed. Ischium moderately long, one-half the length of merus; dorsal surface with a row of moderately short setae; ventral surface with 2 - 3 protuberances and tufts of short setae; mesial and lateral faces unarmed. Coxa with 2 - 3 tufts of short setae over protuberances.

Fourth pereopod with well developed propodal rasp. Fifth pereopod typical and minutely chelate. Sternite of third pereopod with a prominent tooth proximally.

Pleopods of male 4 in number, unpaired, uniramous; with long, plumose setae. Female with first 3 unpaired, biramous, both rami well developed with dense tufts of long setae; 4th as in male. Uropods well developed, left one considerably larger than the right.

Telson asymmetrical, left lobe larger than the right; separated by a minute cleft; right terminal margin with a row of spinules and tufts of short setae or bristles; left terminal margin with 4 - 5 acute spines and row of spinules and tufts of bristles.

In female, left cheliped never exceeds pereopods in distal extension. Third pereopod exceeds left cheliped by one-half the length of dactylus. Carpus with a short ridge in the distal margin corresponding to the ridge on palm of males, in addition to the ridge on palm as in male.

**Collection localities:** Specimens were collected from Kali estuary and Baithkol area in Karwar, west coast of India.

**Materials examined:** About 100 specimens comprising both males and females were examined. The shield length ranged from 2.0 to 6.0 mm. Many of the females carried eggs.

The eggs were oval, dark brown to dirty green in colour immediately after oviposition, turning to pale and transparent when about to hatch. The egg size ranged from 0.30 to 0.34 x 0.23 to 0.25 mm.

**Habitat:** This species shared the habitat with *Diogenes avarus* and *D. macclaughlinae* at Baithkol, which has an admixture of sand and mud. In estuarine areas it was commonly found in association with *D. avarus* and *Clibanarius padavensis* occupying the lower part of the intertidal zone.

**Colour:** Shield, light gray or light green or pale. Ocular peduncle with a short longitudinal band of dark gray to dark brown colour. Antennular peduncle with a transverse gray band; flagellum without chromatophores. Antennal peduncle with few dark grey patches; flagellum with alternating dark and pale transverse bands between articles. Pereiopods with transverse dark grey bands.

**Remarks:** This species is named *Diogenes karwarensis*, after the type locality, Karwar, from where the specimens were discovered.

TABLE I

Character	<i>Diogenes avarus</i> Heller	<i>Diogenes karwarensis</i> sp. nov.
Ocular peduncle	2/3 to 3/4 length of shield.	1/2 to 2/3 length of shield.
Antennular Peduncle	exceeds ocular peduncle by 1/3 to 2/5 length of ultimate segment.	exceeds ocular peduncle by 1/2 to 2/3 length of ultimate segment.
Left cheliped:		
Palm	shorter than carpus; dorsal surface granulose.	longer than carpus; dorsal surface spinulose.
Carpus	longest of all segments; ventral distal margin unarmed.	moderately short, ventral distal margin with a row of short spines.
Merus	ventral distal margin unarmed.	ventral distal margin with 3 - 4 long, conical, acute spines.

## DISCUSSION

The species closely resembles *Diogenes avarus* Heller in having similar habitat preference, general size and shell selection. Some of the salient features by which these two species could be distinguished are given in Table 1.

## ACKNOWLEDGEMENTS

We are grateful to Dr. P.A McLaughlin, Dr. Janet Haig and Dr. K.N. Sankolli for their valuable suggestions. Also, thanks are due to the authorities of Karnatak University for providing laboratory facilities.

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## A NEW SPECIES OF THE GENUS *EUPHILOSCIA* PACKARD (CRUSTACEA: ISOPODA: ONISCOIDEA) FROM WALT AIR, INDIA<sup>1</sup>

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(With eleven text-figures)

A new oniscoid isopod *Euphiloscia rishikondensis* belonging to family Ligiidae is described. Thirty male specimens were collected under rocks near the shore at Rishikonda, Waltair. *Euphiloscia rishikondensis* sp. nov. is compared with *E. elrodii* Packard, 1873.

In the course of the study of the systematics of isopods (1978-1981), a number of new species belonging to the genus *Euphiloscia* Packard (1873) were collected from Waltair coast.

Isopods of the genus *Euphiloscia* have not been reported from India so far. Significant contributions to the knowledge of Indian oniscoid isopods are those of Collinge (1914), Barnard (1936), Joshi and Bal (1959) and Ramakrishna (1971). The genus *Euphiloscia* is so far represented by only one species, namely *Euphiloscia elrodii* (Packard 1873). The present species is described here as a new species.

***Euphiloscia rishikondensis* sp. nov.**

Male: Length 7 mm; breadth 3 mm.

Colour: Brown body with dark spots on the mid-dorsal portion.

Body oblong-oval, somewhat longer and slender, attains greatest breadth at pereonite 5,

dorsal surface slightly convex, studded with granules in the centre. A large number of tubercles arranged in two rows on each side of pereon. Cephalon distinctly separated from pereonite 1; twice as broad as long. Dorsal surface of cephalon covered with numerous large tubercles; frontal margin nearly truncate and not produced into a lobe. Antero-lateral angles of cephalon rounded and not produced into lobes. Eyes large, oval and located at antero-lateral angles of cephalon.

Antennule reduced in size, triarticulate, with broad basal article, article 2 short and terminal article longer than basal article.

Antenna very much longer, slender, almost reaches the end of pereonite 3. Antenna with 5 peduncular articles, article 1 short, article 2, 3 subequal, article 4, roughly 1 1/2 times longer than article 3, article 5 twice as long as article 4. Antennal flagellum 15-articulate; all articles covered with strong setae, terminal article provided with a pointed bristle.

Maxillule with 12 stout recurved spines on

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